

REMARKS/ARGUMENTS

Claims 1-5 and 7-19 are pending. Claims 14-16 have been revised as kindly suggested by the Examiner. Claim 8 has been revised to indicate the conventional average molecular weight unit, Da. The Applicants do not believe that any new matter has been introduced. Favorable consideration of this amendment and the remarks below and allowance of this case are respectfully requested.

Objection

Claims 14-16 were objected to as informal. This objection is moot in view of the amendments above.

Rejection—35 U.S.C. §112, second paragraph

Claim 8 was rejected under 35 U.S.C. 112, second paragraph, as being indefinite. This rejection is moot in view of the amendment above.

Rejection—35 U.S.C. §102(b)

Claims 8, 9 and 19 were rejected under 35 U.S.C. §102(b) as being anticipated by Arai, et al., U.S. Patent No. 5,763,583. This rejection does not apply to claim 8, because Arai does not disclose keratin from feathers having an average molecular weight of 8,000 to 13,000 Da. Claims 9 and 19 have been directed to keratin from feathers and so this rejection no longer applies.

Rejection—35 U.S.C. §103(a)

Claims 1-5 and 7-19 were rejected under 35 U.S.C. §103(a) as being unpatentable over Shiojima, et al., U.S. Patent No. 6,066,316, in view of Mullner, et al., WO 0236801 (abstract). This rejection is traversed for the reasons below. Briefly, Shiojima does not “teach a hydrous state of 20 to 80% or an alkali concentration of 0.1 to 0.5 m/l” (OA, top of page 4). Mullner was applied as a secondary reference teaching a keratinous material “having a water content in the range of 5-99 wt%” for the purpose of eliminating toxic constituents of the final keratin product, OA, top of page 5. The alkali concentration of 0.1 to 0.5 mol/L required by dependent claims 3 and 12 is deemed non-critical by the rejection.

Shiojima discloses alkali treatment of hydrated feathers, but it does not provide a reasonable expectation of success for the superior results achieved by selection of a hydrous state for the keratin raw material ranging from 20 to 80% as shown in Table 2. Mullner, being directed to water content ranging from 5-99 wt.%, does not suggest selecting the narrow range required by the claims, nor provide a reasonable expectation of success for improving the decomposition rate by selecting a water content in this range as shown by Table 2 below reproduced from the specification.

[0041]

[Table 2]

Water content (%)	12	20	30	40	50	60	70	80
Decomposition rate (%)	47.5	76.1	79.5	77.5	75.6	78.0	80.0	73.3

As shown above, selection of a water content between 20 and 80% provides a superior decomposition rate compared to a lower water content of 12%.

Furthermore, the keratin produced according to the invention had significantly improved properties, such as decreased undesirable odor as shown by Table 4 on page 19 of the specification (reproduced below):

[0045]

[Table 4]

	Product 6 is superior	Promois WK is superior	Undecided
Color	2	2	16
Smell	12	3	5

[0046]

As clear from the results in Table 4, most panelists smelled less in the solution of the product of the invention (Product 6) as compared with the comparative solution (Promois WK). That is, the solubilized keratin obtained by the method of the invention is substantially decreased in smell as compared with solubilized keratin prepared by conventional process.

Moreover, the tensile strength of hair treated with the keratin produced according to the invention (Product 6) was superior to that of the control (Promois WK) as shown by Table 6 (reproduced below):

[0050]

[Table 6]

	Untreated hair	Bleached hair	Bleached hair + water	Bleached hair + feather keratin (invention)	Bleached hair + wool keratin
Kgf/mm <sup>2</sup>	35.95	31.32	30.18	39.18	36.56

Neither prior art document art discloses or suggests the importance of the process steps of the invention and does not provide a reasonable expectation of success for the superior keratin extraction and keratin compositions made by this process.

The Applicants conducted further studies illustrating the benefits provided by the invention presented by the previously filed Declaration. As shown there, keratin raw material (feathers) hydrated to 50% had a significantly higher decomposition rate than identical features hydrated to 10%.

Table I

Water content (%)	Reaction time (hours)	Decompositon rate (%)
10	6	50.7
10	18	50.3
50	6	79.8
50	18	93.3

The prior art, even with the addition of Mullner, provides no motivation for hydrating the keratin raw material, such as features, to a degree of 20-80% as required by the invention, and cannot provide a reasonable expectation of success for the superior decomposition attained. Accordingly, this rejection cannot be sustained.

Conclusion

This application presents allowable subject matter and the Examiner is respectfully requested to pass it to issue. The Examiner is kindly invited to contact the undersigned should a further discussion of the issues or claims be helpful.

Respectfully submitted,

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